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ABSTRACT

This study was conducted to examine the developmental patterns in young children's ability to use others as a resource in problem-solving situations and to compare the roles that mothers and same-age peers play as resources for children in such situations. A total of 48 middle-class 3-, 4-, and 5-year-old children participated in the study with their mothers and 48 peers of the same age and sex. Each child played three problem-solving games in three conditions; alone, with the mother, and with the peer. The child and partner, if present, were told that the game was for the child to play, but that the partner could help when asked. Each game lasted 5 minutes and was recorded by videotape. Results showed that with their peers, older children made more attention-focusing statements, asked more questions, and made more relevant comments than younger children did. With their mothers, older children made fewer requests for help and fewer irrelevant comments than younger children. With their peers, the younger children were helped when they and their partners used communication patterns which kept them focused on the task. With their mothers, the one variable that was associated with success was the mother's incomplete but relevant responses, which maintained the child's attention but did not provide the complete answer to his or her question. It was concluded that from 3 to 5 years of age, the child utilizes the peer system and the mother-child system in quite different ways. (Author/JMB)

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Management of Attention in Child-Child and Mother-Child Interaction

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The research to be presented in this paper was designed to answer three questions. First, in what ways do preschool children seek assistance from other people when they are in problem solving situations? Second, what behaviors do mothers and peers employ when children are faced with these problems? Third, what behaviors of children, mothers, and peers are characteristic of the most effective problem-solvers? In particular, how is the child's attention to the task managed when the peer or mother is present?

Previous research has indicated that by two years of age, the presence of a peer has an impact on the child's behavior: with a peer present toddlers will engage in more developmentally advanced play with toys than when the peer is absent. Mueller's work indicates that attention focusing statements in verbal interaction (such as "Hey" or saying the partner's name) play an important role in the maintenance of verbal exchanges between young children in free play, but the contribution of particular communication behaviors in structured situations with peers has not been examined.

The impact of adults' responsiveness and nurturance on children's curiosity and exploratory behavior has been extensively documented in unstructured situations. In addition, the potential for mothers to be didactic by directing their children's cognitive behavior has been noted when mothers have explicitly been asked to teach their children. However, the contribution of a didactic style has not been demonstrated in a problem solving situation, where utilizing another person as a resource and even communication itself, is optional for the child.

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Thus, we do know about some of the features of the child's interactions with others. However, there are three features of the experiment we are reporting which make it of importance to the interaction literature. First, it is one of only a few studies which directly compare mother-child interaction and peer interaction in the same situation and with the same subjects. Second, unlike the mother teaching or peer tutoring situations where the responsibility for conveying information lies with the person who already knows it, our study placed the responsibility for getting help on the child who was faced with the problem. Third, the present approach can be contrasted with a "group differences" approach. For example, Hess and Shipman compared mothers across different social class groups and made inferences about the differences in communication abilities for all members of each group. The approach of the present study, however, allows for a specification of which behaviors within groups are actually assets in communication effectiveness.

Method

The subjects in this study were 48 middle class 3,4, and 5 year olds who will be referred to as the "target children." They participated with their mothers and 48 peers who were matched to the target children by age and sex. Each target child played 3 problem solving games, which involved finding alternative ways of a) constructing a support to repair a toy table, b) blocking a hole in a small bird-feeder to prevent seeds from spilling, and c) contriving a device to transfer colored water from one container to another. One game was played alone, one with the mother, and one with the peer; with all orders counterbalanced. The target child and his or her partner, if present, were told that the game was for the child to play but that the partner could help when asked. Each task was set up so that there were six items which might be used

to work on the problem, but only three of them would actually solve it. The games each lasted five minutes and were recorded by a hidden videotape camera.

The verbal behavior was transcribed from the tapes and coded with a nine item code which is summarized in Table 1. We considered the aspects of the interaction from the point of view of their function in the problem solving situation rather than their linguistic form so we coded items such as attention focussing statements, commands, requests for help, questions, praise, and other comments relevant or irrelevant to the task. In addition three behavioral behavioral aspects of the children's performance on the tasks were coded directly from the tapes. These were the number of objects used by the child, the total number of attempts made to solve the task, and the number of successful attempts.

Results

On the 3 outcome measures, older children performed better than younger ones. They made more attempts to solve the problem, tried more different ways of solving it and achieved more successes. These 3 measures were also highly interrelated. Age differences in the communication behavior were also distinctive, as shown in Table 2. With their mothers, older children made fewer requests for help and made fewer irrelevant comments. With their peers, older children made more attention focusing statements, asked more questions, and made more relevant comments than younger children.

To see what communication skills were associated with effectiveness on the task, we performed correlational analyses between the communication behaviors and the outcome measures. To simplify our presentation, I will describe our results across the three outcome measures.

As shown in Table 3, the children's effectiveness with the tasks seemed to be associated with different aspects of communication, depending on whether one looks at younger or older children, and at the peer or the mother-child systems.

With their peers, the younger target children---the three and young fours ---were helped when they and their partners used communication patterns which kept them focused on the task. Key variables were the attention-focusing statements of both peers and children, the relevant comments of peers, the complete verbal responses of children, and peers evaluative statements.

With their mothers, young children's effectiveness reflected a different pattern. Rather than being positively influenced by attention focusing behaviors, the children seemed to be negatively influenced by distracting behaviors. Thus poorer performance was associated with irrelevant comments of both mothers and children. One interpretation of this is that a tolerance for irrelevant statements led to less exploration of the tasks in this situation. However, the one variable that was associated with success for younger children was the frequency of their mother's incomplete but relevant responses, which maintained the children's attention, but did not provide the complete answers to their questions. We called this the "Socratic strategy" and will return to it later.

Older children who were successful displayed not only a responsiveness to attention focusing statements, but also an unexpected tolerance for distraction. Here, relevant comments by children and their peers were associated with effectiveness, but so were their irrelevant comments and the peer's irrelevant verbal responses.

With their mothers, older children, like younger ones, performed more poorly when they made more irrelevant comments.

Further analyses of the irrelevant comments revealed trends that indicated that it was the target child who usually initiated the comments. Also, it tended to be the mother who refocused attention back to the task in the mother-child situation, but the target child tended to take over in the peer condition, whether the target child or the peer had initiated the irrelevant comments. We also noted that irrelevant comments correlated negatively with age in the mother condition but not with the peers while irrelevant comments with peers were associated with the use of attention focusing statements and with relevant comments.

Thus, these further analyses indicate that with peers, older children assumed primary responsibility for refocusing attention to the task (whether they or their partner had been the distractor), where as the younger children left this responsibility to their mothers when present. It is possible that younger children expected their mothers to serve as focusing agents, and when the mothers both allowed and produced distracting statements, this served as a cue to the children to withdraw their attention from the task.

Discussion

To summarize, the most effective younger children and their peers both used and received attention focusing statements, and made and heard fewer irrelevant statements. The most effective older children showed an ability to focus attention on the task, and also a spontaneity of interaction that included both relevant and irrelevant conversation. For example, one older peer demonstrated this flexibility when she said "You got your giggle box upside down. Oh, this is hard to do."

The most effective mothers were ones who were less distracting and who exhibited a Socratic style of interaction. That is, they responded to their children's questions not by providing complete answers, but by leading their children to find the answers on their own. For example, when one child asked "What else will work?" his mother answered "You could probably find some things, couldn't you?" and her child then said "Maybe this pen will work. Maybe it will help it out. Yep."

In conclusion, this study helps clarify the distinctive contribution of peers and mothers to the child's cognitive development. Recently, the cognitive significance of peer interaction both has been celebrated, as in the predictions of the promise of peer tutoring programs, and has also been described as less efficient and effective as in the case of language learning. However, the attention-enhancing contribution of peers is supported by previous findings that preschool children spend more time and gain more information in exploratory situations with peers than when alone. Hartup has recently argued that the strength of the peer system lies in its informality, and the present results corroborate such a view in the context of child-directed problem solving.

Thus, from three to five, the child utilized the peer system and the mother child system in quite different ways. The peer system becomes a more effective resource, but its improvements are not ones that are simply successive approximations to the mother-child system. Both are rich but very different resources in the child's cognitive development.

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Table 1

Code for Communication Behaviors and Performance Measures

Behavior	Definition
Communication Behaviors	
Attention focusing statements	Utterances that attempt to draw the listener's attention to the task, e.g., "hey", "look", and the partner's name
Directives	Requests of a listener to perform, not to perform, or cease to perform an action
Questions	Requests for information
Requests for help	Solicitations of aid from the listener
Relevant comments	Other statements that do not pertain to the task
Irrelevant comments	Other statements that do not pertain to the task
Complete responses	Replies to directives or questions which provide accurate and sufficient information
Incomplete responses	Replies to directives or questions which provide relevant but insufficient information, e.g., Child: What else will work? Mother: You could probably find some things, couldn't you?
Evaluative statements	Praise or criticism
Performance measures	
Alternatives	How many of the six different items were used by the child
Attempts	Number of different efforts the child made to find a solution (could exceed six if child tried same item at several different points in session)
Successes	Number of solutions attained in the five minute session

Table 2

Relationship of Age in Months to Communication Behaviors and to Outcome Measures on Problem-Solving Task for Children, Mothers, and Peers

	Speaker			
Communication Behavior	Child with Mother	Mother	Child with Peer	Peer
Attention focusing			.29*	
Questions			.30*	.30*
Directives				
Requests for help	-.32*	-.35*		
Relevant comments			.43*	.46*
Irrelevant comments	-.34*			
Complete responses			.32*	
Incomplete responses	-.44*			.35*
Irrelevant responses	-.41*			
Total utterances			.43*	
Outcome Measures				
Attempts	.31*		.41*	
Alternatives tried	.44*			
Successes	.38*		.54*	

*$p < .05$, $df = 46$

Table 3

Correlations[a] Between Outcome Measures on Problem Solving Tas

and Communication Behaviors of Children, Peers, and Mothers: Younger an

Condition	Outcome[b] Measure	Communication Behavior
Child with peer	A	Complete Responses
		Relevant Comments
	S	Attention Focusing
		Relevant Comments
		Irrelevant Comments
Peer	T	Attention Focusing
	S	Attention Focusing
		Evaluative Comments
		Relevant Comments
		Irrelevant Responses
Child with Mother	T	Irrelevant Comments
Mother	T	Relevant but Incomplete Responses
		Requests for Help
	A	Irrelevant Comments
	S	Relevant but Incomplete Responses

[a] all $p < .05$.

[b] A = Alternatives Tried; S = Successes; T = Total Attempts

.der Subjects

Age of Target Child	
Younger	Older
.44	
	.48
.54	
	.58
	.47
.46	
.66	
.54	
	.48
	.55
-.42	
.49	
-.36	
-.45	-.47
.47	